IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Pierre C. Delago	Docket: 14622.01	
Application No.:	10/786,202	Confirmation No.	3040
Filing Date:	February 25, 2004	Examiner:	Thomas J. Brahan
Title:	CRANE RADIAL SUPPORT BEARING	Group Art Unit:	3654

Mail Stop: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

The enclosed Second Amended Appeal Brief is submitted in response to the Notification of Non-Compliant Appeal Brief mailed on December 19, 2007, in the above-captioned application.

The Examiner rejected the Amended Appeal Brief filed on November 26, 2007, under 37 C.F.R. §41.37(c)(1)(v), alleging that the Applicant is required to follow "EACH element of the independent claim . . . immediately, in parenthesis, by the appropriate specification page and line numbers and its reference numeral." Applicant respectfully submits that such identification is not expressly required by 37 C.F.R. §41.37(c)(1)(v). This regulation only requires that the brief contain "a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, which shall refer to the specification by page and line number, and to the drawings, if any, by reference characters." (The rest of the paragraph pertains to means-plus-function or step-plus-function claims, which are not relevant here).

Applicant respectfully submits that this requirement was met in both the original and Amended Appeal Briefs. However, to aid understanding of the invention and to further consideration of the appeal, Applicant has amended the Summary of the Claimed Subject Matter to provide the information required by the Examiner.

It is believed that no additional fees are due in connection with this filing. However, the Commissioner is authorized to charge any additional fees, including extension fees or other relief

which may be required, or credit any overpayment and notify us of same, to Deposit Account No. 04-1420.

Respectfully submitted,

DORSEY & WHITNEY LLP
Customer Number 25763

Date: Jan 2, 2008

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

SECOND AMENDED APPEAL BRIEF

TABLE OF CONTENTS

(i) REAL PARTY IN INTEREST

The present application has been assigned to Hydralift AmClyde, Inc., a Delaware corporation.

(ii) RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to the present case.

(iii) STATUS OF CLAIMS

Claims 1-55 have been cancelled.

Claims 56-69 are pending and are herein appealed.

Claims 56-61 and 67-69 stand rejected under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274).

Claim 62 stands rejected under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274) and further in view of deJong (U.S. Patent No. 4,395,160).

Claim 62 also stands rejected under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274) and further in view of Ehret (U.S. Patent No. 4,723,852).

Claim 63 stands rejected under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274) and further in view of Zaugg (U.S. Patent No. 3,292,981) or Baker (U.S. Patent No. 2,069,471).

Claim 64 stands rejected under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274) and further in view of Goss et al. (U.S. Patent No. 4,061,230).

Claims 65-66 stand rejected under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274) and further in view of Burnett (U.S. Patent No. 13,976).

(iv) STATUS OF AMENDMENTS

No claim amendments were filed subsequent to the final rejection.

(v) SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is generally directed towards a crane having a vertical post and superstructure supporting a boom (see post 5, superstructure 20 and boom 10 in applicant's Fig. 1) that includes a novel system for receiving and delivering into its base the radial loads imposed on the crane as objects are lifted, lowered and carried by the crane's boom. The system includes a roller chain (e.g., 100 in Figs. 3 and 5) extending in a radial arc over the outer bearing surface of the crane's center post. The roller chain is anchored at each of its ends to the superstructure, to tension the linked rollers into rolling contact with the outer bearing surface of the post and to equalize substantially the radial forces exerted by each roller on the outer bearing surface. The roller chain is positioned such that the arc of rollers is substantially symmetrical with respect to the vertical plane of boom motion (i.e., the vertical plane bisects the arc of the rollers 100). This system maintains substantially equal distribution of the radial component of boom loads across all rollers in the roller chain, resulting in substantially even bearing roller wear during operation of the crane.

Specifically, claim 56 recites a crane (1) (e.g., spec. at page 5, line 27; Fig. 1) having:

a vertical post (5)(e.g., spec. at 5, line 28; Fig. 1) including a post bearing surface (outer surface of post 5) forming at least a partial arc about the vertical axis of the vertical post (e.g., spec. at page 2, lines 12-16; page 3, lines 4-8; and page 9, lines 6-10; Figs. 3 and 5 (depicting the post and its bearing surface 5));

a superstructure (20) pivotal about the vertical post (5) and including a boom foot having a pivot point (e.g., spec. at page 3, lines 1-20; page 6, lines 12-20; Fig. 2 (superstructure 20, boom foot 22, pivot point 32));

a boom (10) extending from the boom foot (22) and pivotable in a vertical plane about the pivot point (32) in response to one or more lines (25) extending between the boom (10) and a swivel-post head (15) near a top of the vertical post (5) (e.g., spec. at page 5, line 27 to page 6, line 3; Fig. 1 (boom 20, boom foot 22, swivel-post head 15, wire rope 25, vertical post 5));

a single roller chain (100) encompassing at least a segment of the post bearing surface (e.g., spec. at page 7, lines 19-27 with reference to Fig. 3; page 7, line 28 to page 9, line 5, with reference to Figs. 4A and 4B; and page 9, line 6, to page 10, line 25, with reference to Figs. 5 and 7), comprising:

a plurality of rollers (105) arranged in a pivotally-linked sequence (e.g., by link plates 110 and 115; spec. at page 8, lines 13-20; Fig. 4A; or link plates 110 and 116; spec. at page 8, lines 25-26; Fig. 4B), each roller including a rotational axis generally parallel to the vertical axis (30) of the vertical post (5) and a roller surface in rolling contact with the post bearing surface (5), wherein the rollers are distributed with equal spacing on an arc along the post bearing surface (e.g., spec. at page 11, lines 14-21) with at least 180 degrees between a first roller and a last roller (e.g., spec. at page 10, lines 13-25 and Figs. 5 and 7 (each of which shows just over half of the symmetrical configuration of the roller chain));

a first anchor (155) coupled to the crane superstructure (20) and operably, pivotally-linked to the first roller (105) (e.g., spec. at page 10, lines 13-25 and Figs. 5 and 7 (each of which shows just over half of the symmetrical configuration of the roller chain)); and

a second anchor (155) coupled to the crane superstructure and operably, pivotally-linked to the last roller (105) (e.g., spec. at page 10, lines 13-25 and Figs. 5 and 7 (each of which shows just over half of the symmetrical configuration of the roller chain));

the first and second anchors (155 in Figs. 5 and 7) being positioned to make the arc of the roller chain substantially symmetrical with respect to the vertical plane of boom motion (e.g., spec. at page 9, lines 22-25; and page 10, lines 16-18) and to tension the rollers against the post-bearing surface (e.g., spec. at page 2, lines 23-27; and page 7, lines 19-27), whereby the pivoting action of the rollers maintains substantially equal distribution of radial loads from the boom across all rollers in the roller chain (e.g., spec. at page 12, lines 27-29).

(vi) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) Whether claims 56-61 and 67-69 are unpatentable under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274).

(2) Whether claim 62 is unpatentable under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274) and further in view of deJong (U.S. Patent No. 4,395,160).

(3) Whether claim 62 is unpatentable under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274) and further in view of Ehret (U.S. Patent No. 4,723,852).

(4) Whether claim 63 is unpatentable under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274) and further in view of Zaugg (U.S. Patent No. 3,292,981) or Baker (U.S. Patent No. 2,069,471).

(5) Whether claim 64 is unpatentable under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274) and further in view of Goss et al. (U.S. Patent No. 4,061,230).

(6) Whether claims 65-66 are unpatentable under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274) and further in view of Burnett (U.S. Patent No. 13,976).

(vii) ARGUMENT

(A) PRELIMINARY STATEMENT

Appellant/applicant respectfully submits that the pending Office Action has not established a *prima facie* case of obviousness as to claims 56-69 because the combination of references relied on for rejection is improper in view of the fundamental differences in the crane structures and load bearing principles taught by Wampach and Kaltenbach. While both Wampach and Kaltenbach describe cranes that experience overturning forces when loaded, their differences in handling load forces are such that their combination in the manner asserted, i.e., converting Wampach's unlinked, ring-contained anti-friction roller set, which does not carry significant overturning forces, into Kaltenbach's linked rollers that carry such forces in a crane having a fundamentally different design (as compared with Wampach and also with applicant's crane), is conceivable only in hindsight guided by the applicant's teaching. Given the disparate teachings of these two references, it would not have been obvious for a person of ordinary skill in the art to combine these references to achieve the claimed invention.

Moreover, even assuming it is proper to combine the Wampach and Kaltenbach references, the combination does not teach or suggest all the claim limitations as required under 35 U.S.C. §103(a). As discussed in detail below, neither reference teaches or suggests certain of the expressly recited features of claims 56-69; thus, their combination is also deficient. Wampach describes a crane having a swing bed 5 pivotally mounted on a support structure including three types of rollers: hook rollers 44 and house rollers 41 (operating on opposite surfaces of plate 28) and vertically disposed rollers 34 (retained in rolling contact with hub 33 by an annular member 35) that together "provide a freely rotating mounting for the swing bed." Wampach at Col. 13, line 22. Wampach has no teaching of a roller chain as recited in claim 56, much less the use of such a chain to distribute a radial component of boom load equally among a plurality of rollers in a chain positioned along the outer bearing surface of a vertical post.

Kaltenbach, while showing the use of a pair of roller chains in one configuration, does not teach or suggest a roller chain that is positioned for substantial symmetry relative to a vertical plane of boom motion, nor does it teach substantially equal distribution of radial loads from the boom across all rollers in the roller chain, both as recited in claim 56.

Accordingly, Appellant/applicant respectfully requests that the Board of Patent Appeals and Interferences reverse the pending rejection of claims 56-69.

(B) DESCRIPTION OF THE APPLIED ART

Claims 56-61 and 67-69 stand rejected under 35 U.S.C. § 103 (a) over Wampach (U.S. Patent No. 2,966,752) in view of Kaltenbach (U.S. Patent No. 1,582,274).

The Wampach Reference

Wampach teaches a truck-mounted crane with a cylindrical hub 33 and a swing bed 5 with a boom foot 9 for attachment of a boom 8, which can be raised and lowered in a vertical plane, as well as rotated with the bed 5. Wampach further shows a series of rollers 34 with vertical rotation axes that roll against hub 33. The rollers 34 are not linked to each other but rather contained in rolling contact with the hub 33 by annular member 35 secured to a plate 36 by bolts or screws. Top and bottom guide plates 38 and 39 are secured to members 35 and 36 and extend inwardly therefrom to overlie the ends of rollers 34 and retain them in rolling contact with the hub 33. See Wampach Fig. 2 and Fig. 3 (provided below) and col. 4. lines 44-55. Wampach does not teach or suggest use of a roller chain.[1]

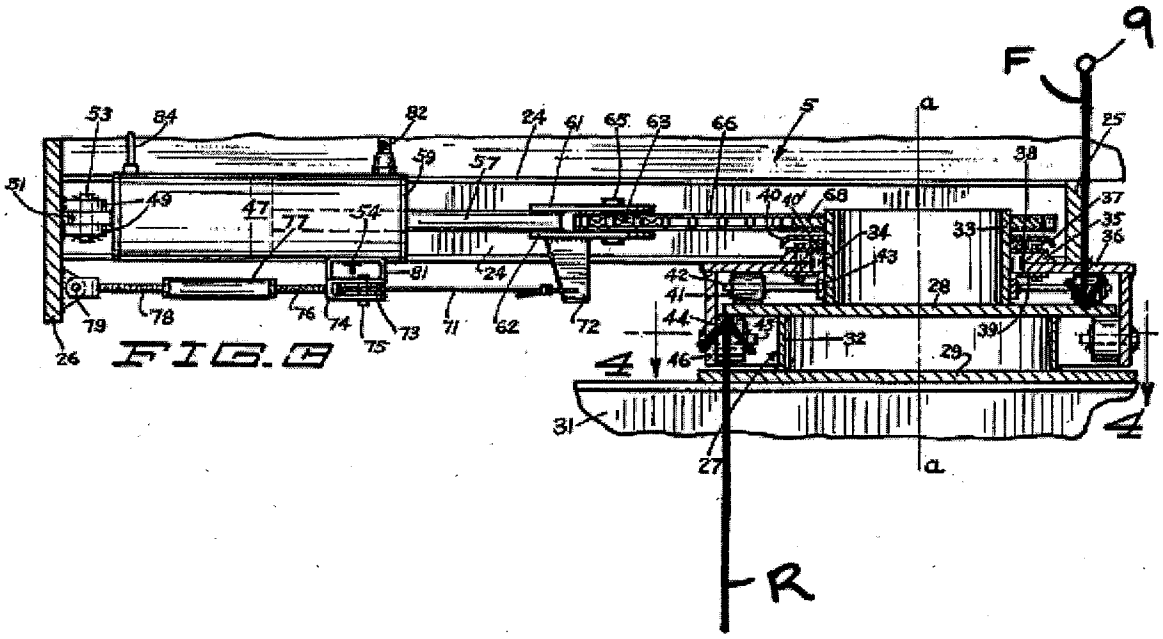
The series of rollers 34, which the Office Action identified as the component of Wampach that could be modified into a roller chain (see Office Action of June 4, 2007, at p. 3, ¶2), are actually described in Wampach as anti-friction rollers (see, e.g., Wampach at col. 4, lines 46-47 and 59-60), which are provided to further the object of reducing friction "to a minimum," resulting in a decrease in the power needed to swing the boom horizontally. Wampach at col. 2, lines 5-11. The rollers carry little or no overturning forces from the boom load, and there is no description of any such functionality of these rollers. To the contrary, other, separate roller structures are provided to carry the overturning forces exerted by the boom: additional rollers 41 and 44 are provided on either side of the horizontal plate 28, with both sets of rollers 41, 44 operating outside the circumference of rollers 34. As described in Wampach:

> "The weight of the swing bed is carried directly upon the plate 28 of the truck frame 2 by suitable anti-friction rollers 41 . . . . To prevent the swing bed from relatively tilting upon the truck frame 2, a plurality of hook rollers are rotatably mounted on short shafts 45 secured to an annular member 46 having its upper

[1] Wampach has a sprocket chain 66 used with rams 57 and 58 and enlarged sprocket 68 to drive the bed and boom for rotation about the rotational axis. However, this sprocket chain has no role for carrying load forces delivered down from the boom. In any event, this chain is not the structure cited as part of the basis for rejection.

> edge suitably fixed to the plate 36 by such means as welding. . . . Thus, rollers 44 cooperate with rollers 41 to support the swing bed upon the truck frame, whereby it is freely rotatable thereon."

Wampach at col. 4, line 61 to col. 5, line 6. In other words, with reference to annotated Fig. 3 provided below, Wampach's vertical boom load (depicted as "F") and overturning forces (depicted as "R") are applied by rollers 41 and 44 to the top and bottom of plate 28, wherein reference numeral 9 indicates the point at which the boom is mounted to the swing bed 5:



Rollers 34 do not perform this boom load-supporting function and merely facilitate rotation of the swing bed 5 around the hub 33. As will be seen, this design principle and the limited role of vertical rollers 34 are contrary to Kaltenbach's and also applicant's designs.

The Kaltenbach Reference

Kaltenbach describes a crane having a horizontal crane boom or arm 10 supported for rotation around a vertical axis by a tower 13. A skirt 15 is coupled to the crane arm 10, encircles the tower 13, and transmits to the base of the tower 13 the unbalanced load of the arm 10 when the arm is with or without load. Kaltenbach at p. 1, lines 105-109 (emphasis added). Kaltenbach's crane arm 10 is not mounted for tilting for vertical plane motion at a boom foot. It is a fundamentally different form of crane arm from that in Wampach or in applicant's invention, being fixed at horizontal and overbalanced. Per Kaltenbach:

> Referring to the drawings, 10 represents the load supporting part of the arm or boom of the crane which may be provided with any

> desired number of hoists 11 and 12. The arm is extended beyond the center of rotation where it is provided with a counterbalancing portion 10^a which preferably overbalances the weight of the main portion 10 of the arm when the latter is provided with no load. The arm or boom is supported on a central stationary tapering tower 13 which is supported on a base or portal 14, and the arm is provided with a long depending skirt 15 which encircles the tower and transmits to the base thereof by a lateral thrust, the unbalanced load of the arm when the latter is with or without load.

Kaltenbach at p. 1, lines 92-108 (emphasis added).

Further, Kaltenbach is also a fundamentally different form of crane from that in Wampach or in applicant's invention because Kaltenbach's boom load is not applied primarily at a boom foot as in Wampach or in applicant's invention, but rather at a top casting 18 that carries a heavy pivotal pin 17.

As illustrated by the annotations to Fig. 1 of Kaltenbach provided below, both the vertical and upper horizontal thrust loads T and U of the crane are applied to the top casting 18. Thus, the casting supports the weight of the crane arm 10, the load P supported by the arm (T = P + crane arm weight) and upper thrust load U. Horizontal (or radial) thrust force L is applied to the base of the tower 13.

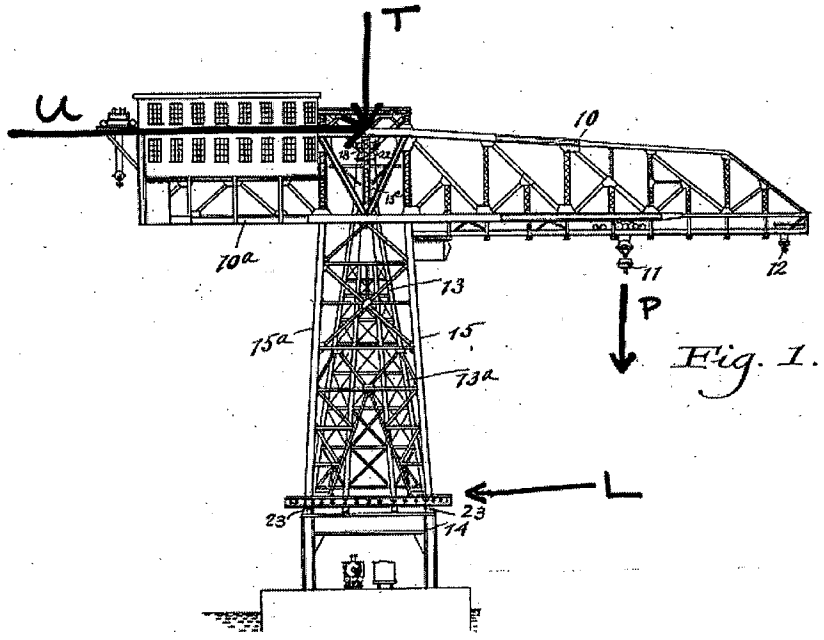


Fig. 1.

As described in Kaltenbach:

> It will be observed in passing, that the entire weight of the rotating structure, as well as the live load supported by it, is transmitted to the top of the tower . . .

Kaltenbach p. 2, lines 34-38.

Kaltenbach also describes an annular series of linked, stacked pairs of rollers 26 (preferably divided into two approximately half-circle chains) carried by an annular girder 15^b at the lower end of the skirt 15, which encircle and engage thrust rails 25 that are mounted on a circular girder 13^b of tower 13. See Figs. 2 and 3. The chains of stacked rollers 26 are attached to the skirt girder 15^b via levers 29 that can be pivoted to adjust the slack of the roller chains. Notably, the levers 29 are positioned asymmetrically with respect to the alignment of the crane arm 10 (see Fig. 2) on the tower 13. This asymmetrical placement of levers 29, which dictates the asymmetrical position of the roller chains with respect to a vertical plane encompassing the crane arm 10 and its rotational axis, is shown clearly in Fig. 2, although not explained; it may be desired to enable access to and pivoting of the adjustment levers 29 that otherwise would be inhibited by tower columns 15^a.

Additional References

The additional references relied upon by the Office Action in rejecting claims 62-66 are:

(1) deJong (U.S. Patent No. 4,395,160) (claim 62), which describes a tensioning system for marine risers and guidelines;

(2) Ehret (U.S. Patent No. 4,723,852) (claim 62), which describes a load compensating roller bearing construction;

(3) Zaugg (U.S. Patent No. 3,292,981) (claim 63), which describes a cage for antifriction bearings;

(4) Baker (U.S. Patent No. 2,069,471) (claim 63), which describes an antifriction screw;

(5) Goss et al. (U.S. Patent No. 4,061,230) (claim 64), which describes a crane crosshead assembly mounted on a pedestal; and

(6) Burnett (U.S. Patent No. 13,976) (claims 65-66), which describes a derrick.

None of these references show any roller chains or anchoring positions for roller chains, nor does the Office Action assert any such teaching by these references.

(C) THE COMBINATION USED TO REJECT CLAIMS 56-61 and 67-69 IS IMPROPER

The PTO has the burden of establishing a *prima facie* case of obviousness under 35 U.S.C. § 103. MPEP § 2142 ("The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness."). "Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *Ecolochem, Inc. v. Southern California Edison Co.*, 227 F.3d 1361, 1371 (Fed. Cir. 2000) (citations omitted). More recently, the U.S. Supreme Court indicated:

> When it first established the requirement of demonstrating a teaching, suggestion, or motivation to combine known elements in order to show that the combination is obvious, the Court of Customs and Patent Appeals captured a helpful insight. . . . . a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.

KSR Int'l Co. v. Teleflex, Inc., 127 S.Ct 1727, 1741 (2007). Therefore, the PTO should show at least that some objective teaching or suggestion in the prior art or knowledge generally held by one of ordinary skill would lead an individual to modify the relevant teachings of a reference *or* should identify a reason that would have prompted a person of skill in the field to combine the elements in the way claimed. *Id.* For purposes of obviousness, "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). The PTO should provide "an apparent reason to combine the known elements in the fashion claimed" and "this analysis should be made explicit." *KSR*, 127 S.Ct. at 1741. Therefore, the asserted combination of Wampach and Kaltenbach is insufficient to establish obviousness, absent some teaching, suggestion, motivation or reason to do so – other than hindsight in view of the present invention – in the references themselves or in the knowledge of one of skill in the art.

It is respectfully submitted that the asserted combination of Wampach and Kaltenbach is not proper, because one of skill in the art would not be motivated "to modify the rollers 34 of Wampach by forming them as [a] roller chain, as to have their mounting adjustable, as to allow slack to be taken up and to control the relative rocking of the upper and lower works, as taught by Kaltenbach," as asserted in the rejection (Office Action at p. 2, ¶ 2). Wampach's vertical rollers 34 do not carry significant boom load forces and thus do not perform the same function as Kaltenbach's roller chains; therefore, they are not interchangeable or otherwise functionally compatible in a way that suggests the asserted combination. Moreover, even assuming one decided to proceed as suggested by the rejection, neither reference shows or suggests how such a roller chain could be introduced and anchored to operate in the place of Wampach's vertical rollers 34.

First, while Kaltenbach describes its rollers 26 as for resisting lateral loads from the unbalanced horizontal boom (Kaltenbach at p. 2, lines 110-116), as noted above, Wampach's vertical rollers 34 do not serve that function. To the contrary, Wampach provides a specific, different structure (rollers 41 and 44 and associated plates 28, 35, 36, 38, 39) to address boom loads and to control rocking. Thus, a person skilled in the art would not be led to make a functional link between Kaltenbach's semi-circular roller sets and Wampach's ring-contained, anti-friction rollers 34, which are provided to reduce rotational friction but have no significant overturning forces applied to them by a boom.

In essence, the Office Action has incorrectly relied upon the appearance of the vertical rollers 34 in Wampach while ignoring the actual functionality of the rollers 34. It would not make sense to replace Wampach's anti-friction rollers 34, which are provided to ease rotation, with a roller chain designed to carry boom forces, because the boom load forces are already addressed by Wampach's rollers 41 and 44 and their associated plate structure as illustrated in Wampach Figs. 2 and 3. While the Office Action ostensibly suggests a modification of only one sub-assembly (Wampach's rollers 34), this one modification would accomplish nothing without further modifications to at least portions of the Wampach swing bed support structure, so that boom load forces would be transferred to the proposed, new roller chain. The nature of these further modifications is not stated in the Office Action, nor is it taught or suggested by the cited references. Thus, the Office Action's asserted modification exceeds any logical bounds of "obvious" modifications.

Additionally, a significant feature of applicant's invention and of the Kaltenbach crane is the location and alignment of the roller chain anchors on a rotating structure, which differs in each design. The Office Action does not cite any teaching or suggestion of how or where Wampach could anchor an inserted roller chain, even assuming the substitution of a roller chain for ring-captured rollers 34 were suggested by the cited prior art combination. To make a roller chain functional as in applicant's invention, anchors must be provided and located somewhere where they can be adjusted, but Wampach has no teaching of where anchors might be placed in its structure.[2]

Given the different functional requirements of the support structures for the Wampach and Kaltenbach cranes as discussed above, there would be no motivation to insert somehow the roller chain of Kaltenbach into the support structure of Wampach as asserted in the rejection. Therefore, the asserted combination fails the threshold test for showing obviousness articulated by the Supreme Court in *KSR*.

(D) THE SUGGESTED COMBINATION DOES NOT DISCLOSE THE PRESENT INVENTION AS RECITED IN CLAIMS 56-69

Independent Claim 56

Even if it were proper to combine the cited references, the combination of Wampach and Kaltenbach would still not produce a roller chain configured relative to the boom as claimed in the independent claim 56. In particular, applicant's claim 56 recites a crane having, in relevant part:

> " a plurality of rollers arranged in a pivotally-linked sequence, each roller including a rotational axis generally parallel to the vertical axis of the vertical post and a roller surface in rolling contact with the post bearing surface, wherein the rollers are distributed with equal spacing on an arc along the post bearing surface with at least 180 degrees between a first roller and a last roller; . . . and
>
> "the first and second anchors being positioned to make the arc of the roller chain substantially symmetrical with respect to the vertical plane of boom motion and to tension the rollers against the post-bearing surface, whereby the pivoting action of the

[2] With Wampach's structure, it further appears that accessibility of the rollers for adjustment or replacement (far more significant, should they bear boom loads) would be problematic and would require redesign of one or more of parts 38, 39 and 40.

rollers maintains substantially equal distribution of radial loads from the boom across all rollers in the roller chain"

(emphasis added). The roller chain positioning and symmetry recited in claim 56 helps to achieve applicant's objective of using the roller chain to resist and distribute equally over a linked roller arc of at least 180 degrees the large overturning force of applicant's boom, when loaded and positioned at a typical operating angle in the vertical plane in which it pivots on a boom foot.

Neither Wampach nor Kaltenbach discloses or suggests the claimed roller chain configuration. As acknowledged by the Office Action, Wampach does not disclose any roller chain. Office Action at p. 2, ¶ 2. However, Kaltenbach also does not teach or suggest the above-recited roller chain.

Specifically, Kaltenbach does not teach the positioning of roller chain anchors to obtain substantial symmetry relative to the vertical plane of boom motion as recited in claim 56. Although no drawing in Kaltenbach directly shows the orientation of boom 10 relative to Kaltenbach's two semicircular roller chains, as seen in Fig. 2 of Kaltenbach, the skirt 15, is formed with four columns 15^a, one at each corner of the skirt 15. According, referring also to Kaltenbach Fig. 1, which shows the boom 10 and counterbalancing portion 10^a, the horizontal arm or boom 10 can only be positioned so that its longitudinal axis is perpendicular to a line extending between any two adjacent corner columns, 15^a, 15^a. Given that constraint, referring to Fig. 2, it can be seen that Kaltenbach's boom must be oriented at either just past a 9 o'clock-3 o'clock position or just past a 12 o'clock-6 o'clock position across the crane base in Fig. 2. (This can be seen by laying a pencil across Kaltenbach Fig. 2, using the top of the figure as 12 o'clock.) Fig. 2 shows the anchoring points for Kaltenbach's two semicircular roller sets (levers 29 on pins 30; see also Kaltenbach Fig. 13) at approximately the 10 o'clock and 4 o'clock positions. As can be seen, in either possible boom position, neither of Kaltenbach's arcs of rollers has its anchors positioned to "make the arc of the roller chain substantially symmetrical with respect to the vertical plane of boom motion" (assuming that Kaltenbach's boom had any vertical plane motion, which--aside from minor tilting--it does not).

The positioning of anchor levers 29 in Kaltenbach is not explained in Kaltenbach but is likely not arbitrary. Kaltenbach's asymmetrical placement of anchor levers 29, which dictates the asymmetrical position of the roller chains with respect to the vertical plane of motion of

crane arm 10 and attached tower 15, apparently provides a space for access to and adjustment of the anchoring levers 29 that might otherwise be inhibited by tower columns 15^a. Absent this asymmetrical placement of the levers 29, it appears the roller chain adjustment functionality performed by pivoting the levers would be more difficult. But whatever the reason, Kaltenbach lacks "anchors . . . positioned to make the arc of the roller chain substantially symmetrical," as claimed in claim 56.

In contrast to the Kaltenbach design, applicant's positioning of its roller chain anchors is designed to be substantially symmetrical to the vertical plane of boom motion to distribute large boom overturning loads back to the crane post bearing surface configured to carry them, where the roller chain can share the load equally across all rollers in the chain. Kaltenbach does not show or suggest this positioning.

Nor does Kaltenbach expressly state that its "two semi-circular chains" would result in substantially equal loading of the rollers in one or both of the chains. In fact, given the asymmetry noted above and the independent adjustment mechanisms 29, 30, 31 anchored to girder 15^b for the end of each chain, it appears that a discontinuity of load sharing among Kaltenbach's rollers 26 would occur between the anchored ends of the roller chains (best seen in Kaltenbach's Fig. 13). This discontinuity makes it unclear whether Kaltenbach could even achieve equal loading of all the rollers 26, particularly because the unbalanced load forces can shift from one side of the boom 10 and skirt 15 to the other. In any event, Kaltenbach does not expressly teach that equal loading is to be achieved. Instead, it appears focused on using the chains to aid rotation and "to control[s] the amount of relative rocking motion between the skirt and the tower due to the unbalanced load." Kaltenbach at p. 2, l. 106-109.

Kaltenbach's counterbalanced boom structure also suggests that the boom loads may migrate from one side of the circle of rollers to the other with the "relative rocking motion," resulting in unequal roller loading, certainly from one side to the other and likely also within each of the chains. In Kaltenbach, the unloaded boom will be overbalanced and load that side of the skirt 15 and corresponding rollers in the arc beneath and centered on counterbalancing portion 10^a; but a heavy enough load will overcome the counterbalancing portion 10^a and load that side of the skirt 15 and corresponding rollers in the arc beneath boom 10 with hoists 11, 12. The Kaltenbach rollers at either end of the tipping axis (when the balance shifts) and those rollers underneath the lighter end of the counterbalanced boom will have little or no boom load. Rollers

on the opposite side of the tipping axis (likely some in each chain) will take the load. In applicant's crane, the boom has no significant counterbalance. Applicant's roller chain will always carry at least the radial force from the boom itself. With anchoring as shown in applicant's Fig. 7, this load will be shared also by the rollers on an axis perpendicular to the boom's plane of vertical motion that also passes through the center of post 5 (first and last rollers; comparable to the rollers located on Kaltenbach's tipping axis). As applicant's boom is loaded, the forces absorbed by the roller chain increase, but they would not normally switch 180 degrees from one side of the post to the other as in Kaltenbach.

For all these reasons, the combination of Wampach and Kaltenbach does not disclose each feature of the invention recited in claim 56 as required to establish a *prima facie* case of obviousness under 35 U.S.C. §103(a). Accordingly, claim 56 is believed to be patentable over the asserted combination of references.

Claims 57-61 and 67-69

Claims 57-61 and 67-69, also rejected on Wampach and Kaltenbach, depend from claim 56 and are believed to be patentable over the asserted combination of the Wampach and Kaltenbach references for the reasons set forth above with reference to claim 56, *a fortiori* in view of their additional limitations.

(E) CLAIM 62

Claim 62 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Wampach in view of Kaltenbach, as applied to claim 56, and further in view of deJong. DeJong mentions use of v-shaped rollers. However, deJong does not show any roller chains or anchoring positions (whether or not placed symmetrically relative to the boom) for roller chains. Thus, deJong does not cure the teaching deficiencies of Wampach or Wampach combined with Kaltenbach. Accordingly, even assuming *arguendo* that Wampach, Kaltenbach and deJong have a suggestion or teaching of their combination, as discussed above, the cited combination does not make obvious the combination with a roller chain configured as claimed in claim 56. Accordingly, still less would the combination make obvious claim 62, dependent on claim 56.

Claim 62 also was rejected under 35 U.S.C. § 103(a) as being unpatentable over Wampach in view of Kaltenbach, as applied above to claim 56, and further in view of Ehret. Ehret shows use of v-shaped rollers. However, Ehret does not show any roller chains or

anchoring positions for roller chains. Thus, Ehret does not cure the teaching deficiencies of Wampach or Wampach combined with Kaltenbach. Accordingly, even assuming *arguendo* that Wampach, Kaltenbach and Ehret have a suggestion or teaching of their combination, as discussed above, the cited combination does not make obvious the combination with a roller chain configured as claimed in claim 56. Accordingly, still less would the combination make obvious claim 62, dependent on claim 56.

For these reasons, claim 62 is believed to be patentable over the applied combinations of references.

(F) CLAIM 63

Claim 63 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Wampach in view of Kaltenbach, as applied above to claim 56, and further in view of Zaugg or Baker. The Office Action asserts that either Zaugg or Baker shows arcuate bearing surfaces. However, neither Zaugg nor Baker shows any roller chains or anchoring positions for roller chains. Thus, neither Zaugg nor Baker cures the teaching deficiencies of Wampach or Wampach combined with Kaltenbach. Accordingly, even assuming *arguendo* that Wampach, Kaltenbach and Zaugg or Baker have a suggestion or teaching of their combination, as discussed above, the cited combination does not make obvious the combination with a roller chain configured as claimed in claim 56. Accordingly, still less would the combination make obvious claim 63, dependent on claim 56. Claim 63 is therefore believed to be patentable over the applied combination of references.

(G) CLAIM 64

Claim 64 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Wampach in view of Kaltenbach, as applied to claim 56, and further in view of Goss et al. '230. The Office Action asserts that Goss et al. shows use of rollers on the front or boom side of the superstructure and idler rollers fixedly mounted on the back side of the superstructure. However, Goss et al. does not show any roller chains or anchoring positions for roller chains. Thus, Goss et al. does not cure the teaching deficiencies of Wampach or Wampach combined with Kaltenbach. Accordingly, even assuming *arguendo* that Wampach, Kaltenbach and Goss et al. have a suggestion or teaching of their combination, as discussed above, the cited combination does not

make obvious the combination with a roller chain configured as claimed in claim 56. Accordingly, still less would the combination make obvious claim 64, dependent on claim 56. Claim 64 is therefore believed to be patentable over the applied combination of references.

(H) CLAIMS 65-66

Claims 65 and 66 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wampach in view of Kaltenbach, as applied to above to claim 56, and further in view of Burnett. The Office Action asserts that Burnett shows use of rollers with a containment pad or flange. However, Burnett does not show any roller chains or anchoring positions for roller chains. Thus, Burnett does not cure the teaching deficiencies of Wampach or Wampach combined with Kaltenbach. Accordingly, even assuming *arguendo* that Wampach, Kaltenbach and Burnett . have a suggestion or teaching of their combination, as discussed above, the cited combination does not make obvious the combination with a roller chain configured as claimed in claim 56. Accordingly, still less would the combination make obvious claim 64, dependent on claim 56. Claims 65-66 are therefore believed to be patentable over the applied combination of references.

(I) CONCLUSION

For the reasons set forth above, Appellant/applicant respectfully requests reversal of the rejection of claims 56-69 under 35 U.S.C. § 103(a).

Should any additional fees be necessary, the Commissioner is hereby authorized to charge any fee deficiency associated with this paper or request to Deposit Account No. 04-1420.

Respectfully submitted,

DORSEY & WHITNEY LLP
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Date: Jan 2, 2008

By: _____
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(viii) CLAIMS APPENDIX

We claim:

56. A crane comprising:

a vertical post including a post bearing surface forming at least a partial arc about a vertical axis of the vertical post;

a superstructure pivotal about the vertical post and including a boom foot having a pivot point;

a boom extending from the boom foot and pivotable in a vertical plane about the pivot point in response to one or more lines extending between the boom and a swivel-post head near a top of the vertical post;

a single roller chain encompassing at least a segment of the post bearing surface and comprising:

a plurality of rollers arranged in a pivotally-linked sequence, each roller including a rotational axis generally parallel to the vertical axis of the vertical post and a roller surface in rolling contact with the post bearing surface, wherein the rollers are distributed with equal spacing on an arc along the post bearing surface with at least 180 degrees between a first roller and a last roller;

a first anchor coupled to the crane superstructure and operably, pivotally-linked to the first roller; and

a second anchor coupled to the crane superstructure and operably, pivotally-linked to the last roller; and

the first and second anchors being positioned to make the arc of the roller chain substantially symmetrical with respect to the vertical plane of boom motion and to tension the rollers against the post-bearing surface, whereby the pivoting action of the rollers maintains substantially equal distribution of radial loads from the boom across all rollers in the roller chain.

57. The crane of claim 56, wherein the pivot point is located above the roller chain.

58. The crane of claim 56, further comprising:

a support collar radially extending from the vertical post;

an annular ring extending from the superstructure; and

a container ring including a plurality rollers having rotational axes generally perpendicular to the vertical axis and wherein the rollers rollingly displace between the support collar and the annular ring.

59. The crane of claim 58, wherein the container ring is located below the roller chain.

60. The crane of claim 56, wherein the post bearing surface is the outer surface of the vertical post.

61. The crane of claim 56, wherein the post bearing surface has a rail and at least one roller of the roller chain is flanged to engage the rail.

62. The crane of claim 56, wherein the rollers of the roller chain have a double inclined faces, the post bearing surface has a rail with a V profile, and the double inclined faces of the rollers matingly interface with the V profile of the rail.

63. The crane of claim 56, wherein the rollers of the roller chain have arcuate faces, the post bearing surface has an arcuate face, and the faces of the rollers of the roller chain matingly interface with the arcuate face of the post bearing surface.

64. The crane of claim 56, further comprising a back roller including a rotational axis generally parallel to the vertical axis and a roller surface in rolling contact with the post bearing surface, wherein the back roller is operably coupled to the superstructure and positioned along the post bearing surface in a location not encompassed by the roller chain.

65. The crane of claim 56, further comprising a containment pad secured to the vertical post and/or the superstructure and adapted to prevent the displacement of the roller chain in at least one vertical direction.

66. The crane of claim 56, further comprising a flange supported by the superstructure and adapted to prevent the displacement of the roller chain in at least one vertical direction.

67. The crane of claim 56, wherein the roller chain encompasses at least approximately 270 degrees of arc along the post bearing surface of the vertical post.

68. The crane of claim 56, wherein the equal spacing of the rollers comprises a radial offset between consecutive rollers in the chain between approximately two degrees and approximately 20 degrees.

69. The crane of claim 56, wherein the equal spacing of the rollers comprises a radial offset between consecutive rollers in the chain between approximately five degrees and approximately 15 degrees.

(ix) EVIDENCE APPENDIX

None.

(x) RELATED PROCEEDINGS APPENDIX

None.